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"Detection of Ice Conditions in the Queen Elizabeth Islands"

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SUMMARY

It has been demonstrated with Nimbus 3 data that melt water on ice packs can be detected by the sharp drop in reflectance that occurs in the reflective infrared portion of the spectrum, reflectance in the visible being changed little. This same useful characteristic has been found in the much higher-resolution, multispectral imagery from ERTS.

Figures 1 and 2 can be used to compare the visible bands (MSS 4 and 5 combined) with the near-IR (MSS 7) in the area just west of Melville Island (near 76N, 115W) on 28 July 1972. Most of the areas that appear distinctly darker in the near-IR than they do in the visible are inferred to be covered with melt water. A few small and very dark areas, mostly near the coast, show up in both bands (see the enlargements of the northwest corner of Figs. 1 and 2 shown in Figs. 3 and 4) indicating that these are open water. This is more clearly shown in Fig. 5, which is a false-color composite of MSS-4 (unfiltered) and MSS-7 (green filter in projector) where in the melt water areas on the ice show up pink and the open water appears nearly black.

Canadian Ice Central charts for 24 July 1972 showed consolidated pack (10/10 total concentration) in the Melville Island area. Two to four-tenths of this was multi-year ice, four-tenths was second-year, and two to four-tenths was first-year. Three to four-tenths puddles on the ice were reported. Mould Bay (77N, 120W), the nearest meteorological station, reported surface air temperatures from 37-43°F. near noon during this period.